

## CHAPTER 4

## MOTOR TRANSPORT OPERATIONS

The motor transport commander employs his assets to provide effective and efficient transportation support. To do this, he must have a thorough knowledge of all aspects of motor transport operations. This chapter contains detailed information on such operations.

**4-1. MISSIONS.** Motor transport unit missions vary based upon their location in a theater of operations. At the operational level, transportation is normally associated with EAC. Transportation support is provided by functionally oriented transportation mode operating organizations such as the TRANSCOM or a transportation composite group employed in the COMMZ. If the operational level does not include EAC transportation units, the COSCOM will provide transportation support. The primary mission of motor transport units at the operational level is to clear ports and move units and material forward. They also support units located in or passing through the COMMZ.

At the tactical level, transportation is normally associated with the corps and divisions. Motor transport units support multifunctional logistics organizations such as the COSCOM and the DISCOM by moving supplies, personnel, units, and equipment to arm, fuel, fix, and sustain the force. They also support units located in or passing through their areas of responsibility.

Whether at the operational or tactical level, motor transport units are usually employed in a general support role within a specified area or along specific routes. Placement should ensure efficient, responsive support, convenient to major customers and distribution operations. Motor transport units can expect to move frequently in response to changes in requirements. The combat HET company adds the dimension of operational and tactical relocation of combat units within the corps. The PLS offers greater mobility for movement of ammunition and other commodities. See Appendix I for conversion tables helpful in planning motor transport operations.

**4-2. COMMAND RELATIONSHIPS.** The mission drives the number and type of motor transport companies that are assigned to transportation or multifunctional battalions. Both types of battalions are organized to meet mission requirements. This is known as task organization. Task organization may change frequently based on the mission, phase of an operation, or priority of support. It usually requires changes in command relationships. Command and/or control is transferred from the headquarters, and the company is assigned to the unit it will be task-organized under. Unit integrity at company level should be maintained.

Two standard types of command relationships for task organization are operational control, or OPCODE, and attachment. Operational control exists when temporary authority is granted to a commander to accomplish specific missions or tasks. Units are placed under the OPCODE of the supported commander with the parent unit exercising command and providing administrative support. Under attachment, equipment and operators are placed on a temporary basis. (See FM 101-5 for a more detailed description of command relationships). Other instances that affect command relationships include attachment or assignment of HN, LOGCAP, or other contract support. In these circumstances, command relationships are determined by law, agreements, or policy on a case-by-case basis.

**4-3. TRANSPORTATION SUPPORT REQUIREMENTS.** Transportation support requirements are assigned to motor transport units through movement control channels using the commitment process. A commitment is the assignment of a support requirement. Although transparent to the mode operator, there are two types of transportation support requirements:

- *Programmed*--identified in advance; allow for allocation of transportation requirements among all available modes.
- *Immediate*--generated during the conduct of operations; cannot usually be anticipated within the movement program planning cycle.

Motor transport units can expect to receive both types of requirements. Movement managers, such as the TMCA, transportation battalion (MC), and MCO, develop movement programs within their area of responsibility and plan the allocation of movement requirements among all transportation modes. The movement program enables motor transport units to plan the optimum use of their assets in advance since they know in advance what most of the requirements are. Effective movement programming requires that motor transport unit commanders accurately report the projected availability of their vehicles to the movement manager.

Movement programs are developed in planning cycles. Shippers request transportation support through the movement manager. The movement manager consolidates all support requests and balances these requests against the capabilities of the mode operators in their area of operation. They assign the appropriate mode for each requirement and publish the movement program. The program is distributed to the shippers, mode operators, and movement control units. When requirements for trucks exceed capabilities, adjustments are made by the movement manager based on priorities for support. See FM 55-10 for more information on movement programming. The movement program may be changed when the movement requirement no longer exists, when origins or destinations change, when a different mode is required, or when priorities change.

When a shipper wants to change or delete a programmed movement, he informs the movement manager. The movement manager must adjust the movement program and inform the motor transport headquarters so it can adjust its planning. The motor transport headquarters relays the change or deletion to subordinate truck units. In-transit storage may be required on an exception basis at origin, destination, intermediate terminals, or TTPs. In-transit storage should be discouraged because it reduces the capability of motor transport units by delaying equipment longer than would ordinarily be required. It also increases the number of trucks required.

**4-4. PRINCIPLES OF MOTOR TRANSPORT OPERATIONS.** Motor transport operations are enhanced with the application of certain principles. Whether at the operational or tactical level, a significant advantage can be realized by reducing turnaround time between missions, maximizing the use of each vehicle's capacity, performing required maintenance, and assigning the proper vehicle type for each mission.

Even the proper application of these principles, however, does not guarantee effectiveness. When shippers and receivers are not prepared to load or unload cargo or are unable to do so, transportation effectiveness is decreased. Potential problems can be alleviated by close coordination between the mode operator, the supporting movement control organization, and the supported unit. Motor transport units rely on the supported unit for the following:

- MHE, personnel, and cargo (ready to load/unload at the time requested).
- Cancellation of requirement if no longer valid.
- Changes to spot times and locations prior to dispatch.
- Release of motor transport equipment immediately after off-loading.

When inefficiencies cause equipment shortages, total tonnage can be increased by decreasing turnaround time. This may include increasing the march rate over the routes or increasing the hours of operation. However, judgment must be used so that the end result does not cause unsafe operations or vehicle accidents.

**4-5. OPERATIONAL PLANNING.** A number of factors should be considered when planning motor transport operations. These include the following:

- Programmed movement requirements, types of cargo to be transported, locations of supported activities, and availability of MHE.
- Capabilities and availability of equipment and units to perform the required tasks. (FM 55-15 contains guidance on motor transport planning.)
- Capacities of the routes to be used.
- Safe march rates over each segment of the MSRs and ASRs.
- Available areas for truck units, truck terminals, and TTPs.
- Tactical situation, weather, and terrain.
- Requirements for support, such as fuel, military police escorts, security, medical, maintenance, and communications.
- Driver documentation, such as travel orders, driver's licenses, motor vehicle documents, and dispatch.

Units must properly plan road movements, prepare march tables, submit movement bids, and coordinate en route support. See Appendix J for information on road movement planning and FM 55-10 for information on movement bids.

**4-6. CLASSES OF OPERATION.** Motor transport operations are characterized as intrazonal or interzonal. Within each category, they may be further defined as local or line haul. Intrazonal truck operations are confined within the territorial boundaries and under the jurisdiction of one headquarters or command. Interzonal truck operations cross boundaries and operate under the area control of more than one headquarters or command. Boundaries are defined between division and corps, corps and theater army, or adjacent divisions and corps. These boundaries also correspond to movement control boundaries or movement regions.

a. **Types of Hauls.** Local (short) hauls have a short running time compared to loading and unloading time. They usually involve two or more intrazonal trips per operating shift per day. They occur within a movement region (for example, within the division, CSG, or ASG area of responsibility). Trucks used for local haul include the 2 1/2-ton and 5-ton cargo trucks.

Line (long) hauls have a long running time compared to the loading and unloading time. They usually involve one trip or a portion of a trip per operating shift. Line hauls are more frequently interzonal, commonly crossing movement control boundaries (for example, between COMMZ and corps or corps and division). Throughput operations from ports or theater storage areas to the

corps and divisions are examples of line haul operations. Truck types used for line haul include the tractor trailer, HET, and PLS.

b. **Hauling Methods.** Four general methods are used in moving cargo and/or personnel by motor transport: direct haul, shuttle or relay, and hub and spoke.

(1) **Direct haul.** A direct haul is a single transport mission completed in one trip by the same vehicles. It does not involve a transfer of supplies or exchange of equipment. It is most often used for local hauls. It can be used for line hauls, especially for operational movement of armor or mechanized forces. Direct hauls used for line haul operations are referred to as express operations. Express operations are established before trailer transfer or cargo transfer points have been set up. They may also be used when there is a need for rapid movement of tonnage over long distances and when normal line haul operations cannot meet the requirement. Sustained express operations are inefficient for both drivers and equipment. They can also result in loss of control by the parent unit.

(2) **Shuttle or relay.** A shuttle is a single transport mission completed in repeated trips by the same vehicles between two points. This method is commonly used in local hauls. A relay is a single transport mission completed in one trip by multiple vehicles without transferring the load. It involves the continuous movement of supplies or troops over successive segments of a route. It is done by changing drivers, powered vehicles (tractors), or both for each segment. This method is most commonly used in line hauls because it is the most efficient method of hauling. Containerized cargo increases the effectiveness of this system and better uses the tonnage capabilities of the trucks. In addition to rapid throughput of cargo, the relay system allows for command supervision and supporting services in each segment of the route. Figure 4-1 illustrates both the shuttle and relay methods.

(3) **Hub and spoke.** A hub and spoke is similar to a relay in that it is a single transport mission completed in one trip by multiple vehicles without transferring the load. It involves moving supplies or troops through a hub terminal between segments of multiple routes. Like a relay, it is done by changing drivers, powered vehicles (tractors), or both at the hub. This method is used in local and line haul operations.

c. **Intermodal Operations.** Part of the theater transportation system may involve intermodal operations. Intermodal operations combine the capabilities of more than one mode for a movement requirement. Motor transport may be combined with other transportation modes to reduce cargo handling and thereby speed delivery. Intermodal decisions are made in movement control channels.

(1) **Piggyback or TOFC.** In this operation, semitrailers are moved in local haul to a rail head, placed on railcars, and moved by rail to the railhead servicing the destination area (Figure 4-2). They are then unloaded from the railcars, coupled to suitable towing vehicles, and delivered to their destination. Piggybacking combines the economy of rail hauls with the door-to-door service of the truck. Where large amounts of cargo are involved, the piggyback operation becomes one segment of a relay.

(2) **Container on flatcar.** The COFC operation parallels the TOFC method except that containers are involved instead of semitrailers. Containers may be either mounted on chassis and then loaded on flatcars or loaded directly onto the deck of the transporting flatcars.

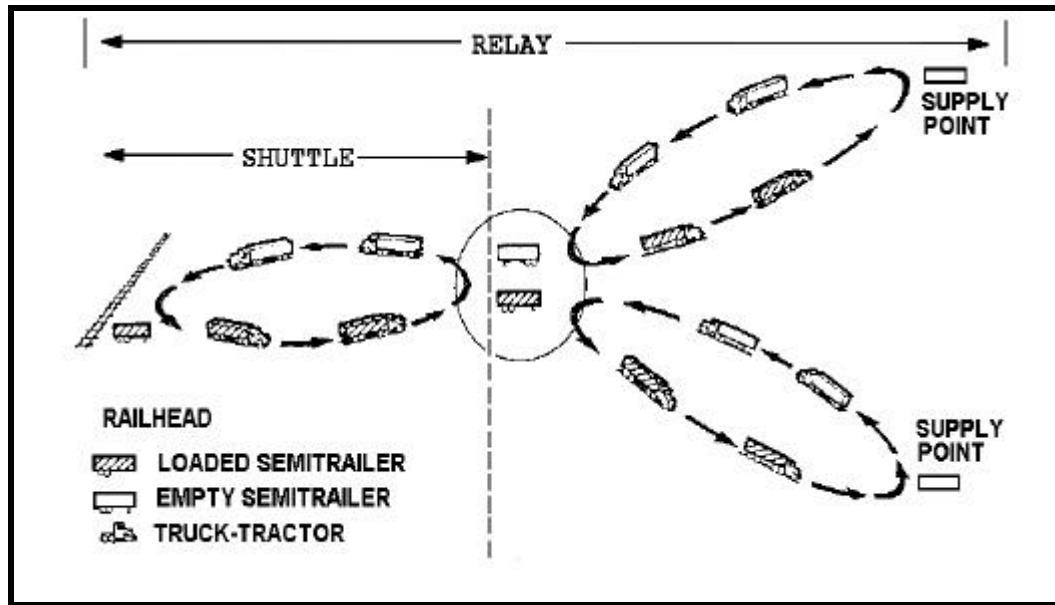


Figure 4-1. Shuttle and relay operations

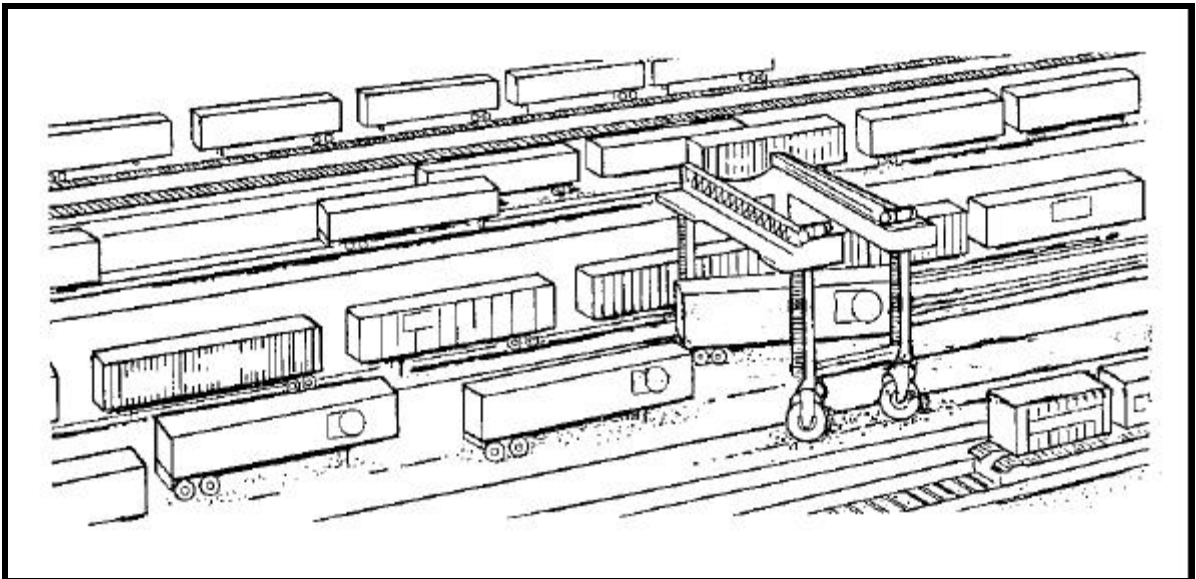
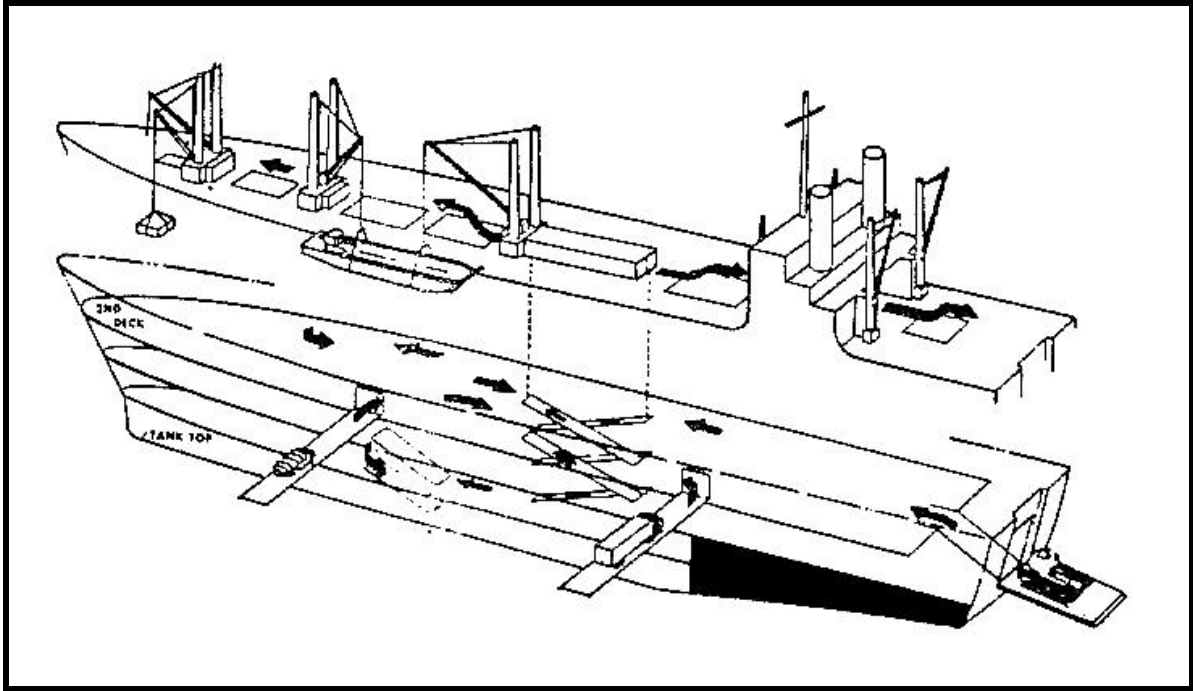


Figure 4-2. Piggyback operation

(3) **Roll-on, roll-off.** In RORO operations, vehicles or semitrailers are loaded aboard RORO watercraft and moved to a destination water terminal. At the destination terminal, they are coupled to towing vehicles while still aboard ship and moved by highway to their destination (Figure 4-3, page 4-6).



**Figure 4-3. Roll-on, roll-off**

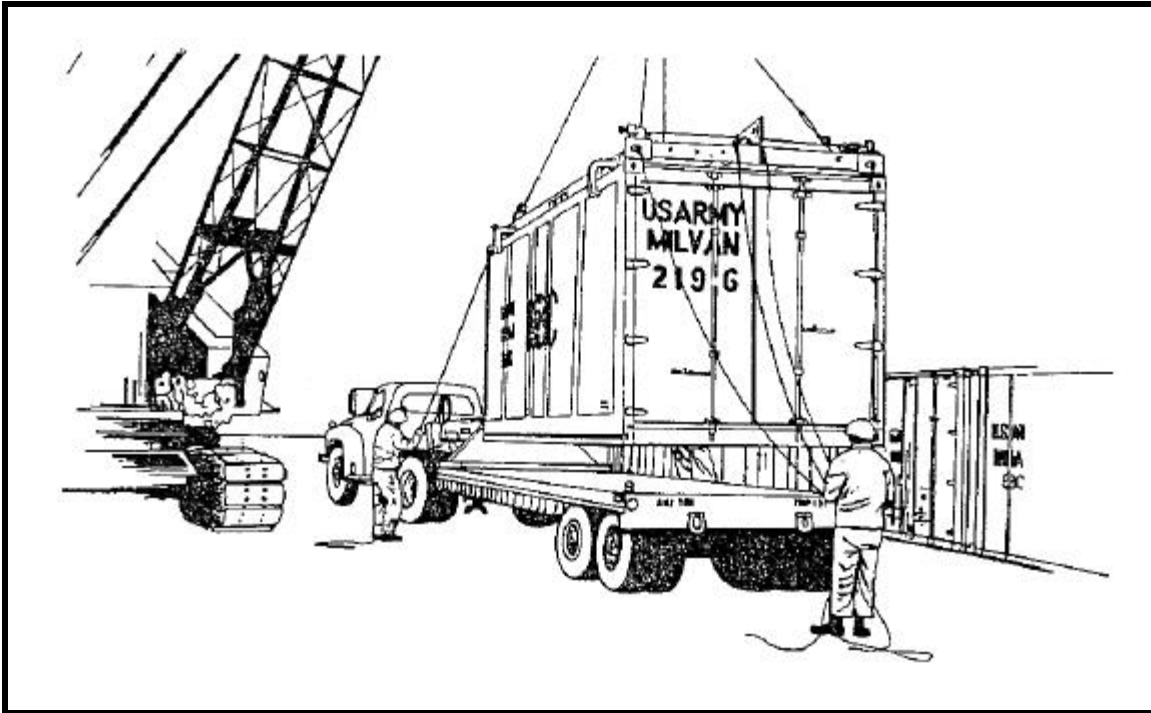
(4) ***Lift-on, lift-off.*** In LOLO operations, loaded trailers or containers are moved to a water terminal, uncoupled from their prime movers, and crane-loaded aboard ship (Figure 4-4). Upon arrival at the destination terminal, the trailers are unloaded by crane, coupled to prime movers, and moved to their destination by highway.

(5) ***Air.*** During CSS air movement operations, vehicles move cargo to the origin air terminal or airfield log pad. The cargo is moved by air to the destination air terminal or airfield, offloaded, and loaded on trucks for movement to its final destination.

(6) ***Lighter aboard ship.*** In LASH operations, semitrailers or containers aboard lighters are launched from ships. They are especially useful where deep water port facilities are not available.

(7) ***Palletized load system.*** The PLS is a tactical wheeled vehicle with a truck bed and flatrack that has a 16 1/2 ton maximum weight capacity. It can pull a PLS trailer that also has a 16 1/2 ton weight capacity for a total carrying capacity of 33 tons. The PLS truck has a hydraulic lifting system that loads and unloads both truck and trailer flatracks. The corps level transportation medium truck company (PLS) is authorized 48 trucks, 48 trailers, and 96 flatracks. The PLS company's primary mission is to transport ammunition from the CSA to the ASP and the ATP(s) as doctrinally outlined in the MOADS. Its secondary mission is to transport general cargo and 20-foot containerized cargo within the corps and division rear areas. NOTE: The PLS can be fitted with a CLK attachment to load and unload the 20-foot container without using a flatrack. The self-load/unload capability of PLS, coupled with potential variations of the flatrack configuration, makes the system well-suited for a number of potential missions. These missions

include cargo and shelter transport, unit mobility and resupply, ASL/PLL mobility, recovery and evacuation, liquid cargo transport, and engineer bridge transport.



**Figure 4-4. Lift-on, lift-off**

**4-7. TYPES OF OPERATIONS.** Motor transport units perform a number of missions that require movement control and traffic control support. These missions include:

- Terminal (water and air) clearance.
- Interzonal motor transport service.
- Truck terminal/TTP operations.
- Area support operations.
- Transfer operations.
- Drive-away operations.
- Container transport operations.
- Retrograde operations.

Routes should be planned to accommodate the traffic volume anticipated during these operations. Some MSRs can be reserved for line haul operations if adequate routes are available for other movements. Movements crossing movement control boundaries should be inbound-cleared in advance with the movement control organization serving the destination area. Routes must be well-marked to assist drivers. Driver training should include route familiarization. Drivers should have strip maps or other maps showing the route to be followed. See FM 55-10 for details on highway regulation. Routes should be the MSRs. These roads should be paved and have good

connecting and access roads. The motor transport headquarters must work closely with its servicing movement control headquarters to make sure that--

- Adequate routes and control measures are established for line haul operations.
- Planning for line haul operations supports movement and distribution requirements.

At the same time, the motor transport headquarters should evaluate all available route information and, when possible, conduct ground reconnaissance to determine--

- Critical points and the ability of vehicles to negotiate difficult grades, defiles, bridges, tunnels, or terrain.
- Route capacity.
- Feasible march rates over each segment.
- Time distances between TTPs.
- Average travel time.
- Route maintenance and upgrade requirements before operations begin.

The movement control organization establishes HRP along MSRs. Reports from the HRP enable the movement control organization and motor transport staff to maintain control of movements. Reports help to effect priorities, to make adjustments in routing, and to coordinate travel over the route in response to changing tactical situations. Highway regulation points may be established at movement control boundaries, terminals, TTPs, and other locations as necessary.

The motor transport unit committed to the move normally affords security and/or reconnaissance support required for movements. However, when convoys need security and reconnaissance support beyond organic resources, it may be furnished on a mission basis by commanders of the areas through which the convoys operate. Coordination should be made with the division/corps rear operations center.

Traffic control using MPs or HN police should be set up at critical points and congested areas. Close coordination between the movement control organization, truck headquarters, military police, and division/corps rear operations center is essential.

a. **Terminal Clearance.** Motor transport units move personnel and cargo out of air and water terminals. Rapid clearance allows for continuous discharge of aircraft or ships that may otherwise be hampered by congestion within the terminal area. The terminal operator (military, civilian, or joint operation) is responsible for off-loading the ships or planes. A movement control detachment should be located at the terminal to plan and coordinate clearance. The motor transport headquarters may assist in planning, setting up truck operations, and regulating the flow of vehicles in the terminal area.

Ideally, heavy maneuver units move their tracked vehicles from the port of debarkation to forward assembly areas by means of nondivisional HETs. The division MCO coordinates for these assets through the corps movement control battalion. Nondivisional HETs are allocated IAW mission priorities. They may be augmented by divisional HETs when needed. Throughout movement operations, emphasis should be placed on preserving unit integrity.



If HET assets are not sufficient to complete the mission, heavy maneuver units should use division or corps medium trucks to move lighter tracked vehicles. Coordination to obtain these assets is made through the division MCO.

Use of division or higher HET assets may be augmented by other transportation modes. When tactical considerations are not paramount, it may be ideal to move heavy units by rail. However, in a tactical environment in which flexibility and responsiveness are essential, the use of HETs should be maximized.

(1) **Logistics over the shore.** LOTS is a special type of clearance operation. It may be executed through a major port that has been denied deep-draft shipping, through a minor port that cannot accommodate deep-draft ships, or over a beach in the event no port facilities are available. This manual discusses the most difficult of LOTS operations--the over-the-beach. Because of poor roads and temporary facilities, beach clearance is more difficult than clearance at a major or minor port. Effective control is needed for rapid clearance and to prevent congestion on the beach. To obtain effective control and rapid clearance--

- Establish truck parks for rapid assignment and dispatch of vehicles.
- Provide adequate communications.
- Coordinate highway regulation planning with the servicing movement control organization and make maximum use of access and exit routes.
- Coordinate engineer assistance to build and/or maintain roads and to provide pierced planking or other similar expedients in soft or sandy areas.

(2) **Beach truck park.** The beach truck park is a centralized area established to route, dispatch, and control vehicles engaged in beach clearance operations. It includes a dispatch facility, parking area, and other appropriate support facilities. A truck park operates in a manner similar to that of a truck terminal in a line haul operation. All vehicles supporting beach clearance operations move into and out of the beach site through the truck park. Several truck parks may be required in a beach clearance operation. The number established depends on--

- Size and other characteristics of the beach area.
- Availability and condition of roads into and from the beach.
- Area or areas suitable for establishing a truck park.
- Number of vehicles supporting the beach operation.

Empty vehicles arriving for loading or vehicles carrying return (retrograde) loads for unloading at the beach are checked in through the truck park dispatcher. These vehicles are dispatched directly to a loading or unloading site on the beach or directed to a holding area within the park. Departing loaded vehicles are also checked in at the truck park dispatcher before onward movement. Based on route control measures and capabilities of the receiving unit to off-load, vehicles may be dispatched directly to their destination either individually or in convoys. If tractor trailers are used in the beach clearance operation, a shuttle system can be used. Shuttle tractors move empty semitrailers between the motor park and beach sites and return loaded semitrailers to the motor park. They spot the loaded semitrailers for onward movement. Line haul tractors then move the loaded semitrailers from the motor park to their destination and return.

Truck park personnel should maintain charts and prepare reports that record operational data to aid in control measures and account for semitrailers. If required, the individual in charge of the terminal will establish semitrailer receipting arrangements with the supported units. Truck park personnel operate the dispatch and marshaling activities of the terminal and prepare or check all cargo and vehicle documentation. They inspect incoming and outgoing semitrailers for maintenance and damage, completeness of equipment, and condition of the cargo load. They prepare and submit periodic yard checks and operational reports on exchange activities and perform all the other duties incidental to operation of a truck terminal. The type of vehicles used in a beach clearance operation directly influences the success of the operation. Tactical all-wheel drive vehicles with the highest flotation have primary consideration. However, semitrailers should be used as the beach area is improved and facilities, roads, and hardstands are constructed. Use of semitrailers is recommended if the original beach conditions allow their use.

(3) **Port truck park.** Motor transport operations in support of the clearance of a port parallel the conduct of operations in beach clearance. A line haul operation may be established in conjunction with the port clearance. A line haul operation allows the throughput movement of cargo as far forward as feasible. Vehicles are loaded at the port, proceed to the destination where they are unloaded, and then return to the port to repeat the cycle. Truck parks exercise and maintain control over the port clearance motor transport operation. See FM 55-60 for details on marshaling yard operations at ocean ports. Fixed-port operations are usually more efficient than bare beach operations. This is based on the availability of berthing facilities, cargo-handling equipment, staging and parking areas, and improved roads. A greater flow of cargo tonnage into and through the port can be expected over that experienced in a bare beach operation. If a port sustains damages, tonnage capability and the movement of vehicles within the port area may be substantially reduced.

b. **Interzonal Motor Transport Service.** Interzonal operations are line haul movements operated for extended distances over MSRs. They usually cross boundaries and can serve the entire theater. Interzonal operations require centralized control provided by a TRANSCOM and/or a COSCOM. The appropriate command and control for line haul operations depends on the mission. Command and control is normally assigned to a motor transport battalion or group. The headquarters may be responsible for operating specific segments of the route or the entire route. The mission drives the number and type of motor transportation, cargo transfer, and trailer transfer units required.

Medium truck companies should be used for line haul operations because tractor trailers are the most effective equipment for line hauls. The combat HET company is also effective in supporting operational mobility. It moves armor and mechanized units and other heavy or outsize equipment.

The semitrailer relay method is usually used in line haul operations. This type of line haul operation includes an origin and destination truck terminal and a TTP(s) located at intermediate point(s) along the route. The motor transport headquarters segments the route to allow near-equal-time distances between TTPs or terminals.

At the origin terminal, shuttle (terminal) tractors move empty semitrailers from the terminal to the supported units where they are loaded. The shuttle tractors return loaded semitrailers to the origin terminal where they are staged and prepared for onward movement. Line haul tractors from the unit assigned to operate the first segment of the route picks up these loaded semitrailers at the origin terminal and moves them forward to the first TTP. Here, the loaded semitrailers are

exchanged for retrograde semitrailers that are returned to the terminal of origin for reuse. Line haul tractors of the unit assigned to the second segment of the route transport the forward moving semitrailers from the first TTP to the next TTP, where similar exchanges are made. The relay is continued until the forward-moving semitrailers arrive at the destination terminal. Shuttle tractors then move the loaded semitrailers from the destination terminal to their ultimate destination for unloading. If empty or return loaded semitrailers are available at the ultimate destination, the destination shuttle tractors should return them to the destination terminal. There they can be documented, staged, and prepared for retrograde relay movement.

Using a semitrailer relay creates a continuous flow of loaded semitrailers moving from GSUs and support agencies to forward areas. At the same time, retrograde semitrailers are moving rearward where they can be reloaded and sent forward again. Retrograde capability should be maximized and every effort made to obtain loads for returning empty semitrailers.

The relay system should be designed to provide the command, supervision, and support services the operation requires. This may include establishing facilities for messing, vehicle service and repair, quartering, administrative support, and logistic services. Mobile maintenance teams and recovery service should be located at strategic points to repair and recover disabled vehicles. Often, the direct support maintenance unit in the area supports the operation, as described in FMs 43-11 and 43-12.

**c. Truck Terminal/Trailer Transfer Point Operations.** Truck terminals and/or TTPs (Figure 4-5) are established with line haul or relay operations. They provide space and facilities for motor transport equipment assembly, dispatch, maintenance, and servicing, as well as for driver rest and comfort.

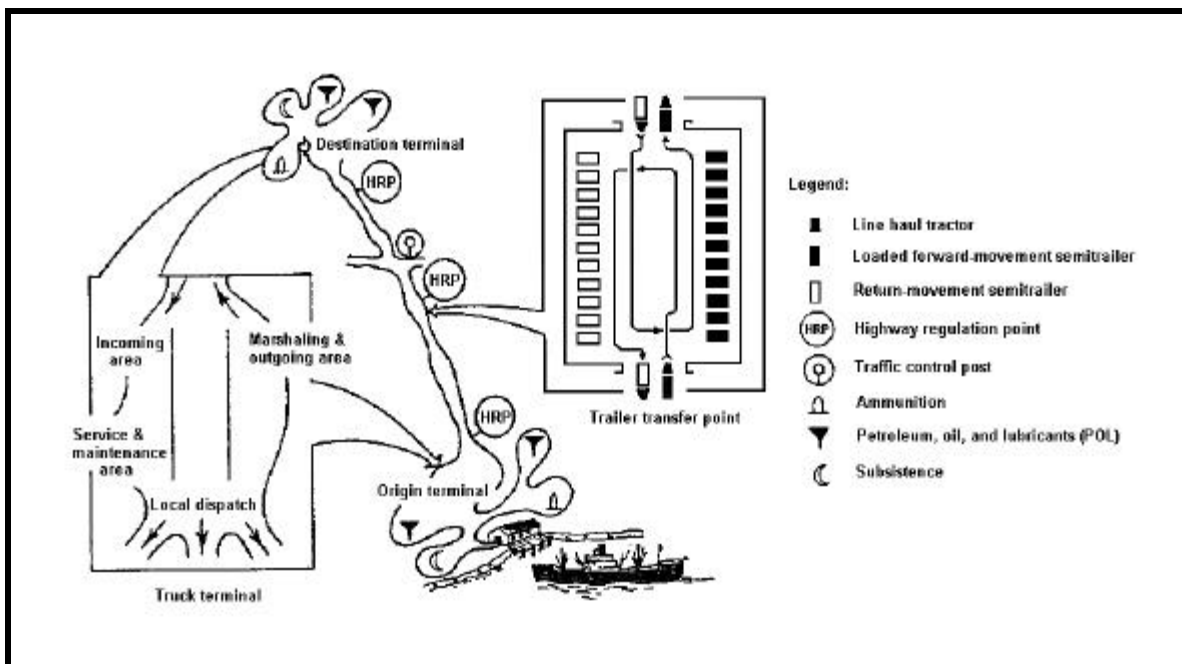


Figure 4-5. Line haul operation with one intermediate TTP

(1) **Truck terminal operations.** Truck terminals are usually located in or near centers of concentrated trucking activities at both ends of a line haul or at intermediate locations (Figure 4-6). They form the connecting link between local pickup and/or delivery service to support units and the line haul operation. They constitute assembly points and dispatch centers for motor transport equipment used in line haul operations. They should not be used for in-transit storage or freight sorting. They are usually located forward of cargo pickup points and to the rear of delivery points. Consider the following factors in selecting terminal sites:

- The size, complexity, and duration of the operation.
- The number and type of vehicles to be employed in the operation.
- Facilities required at the terminals and transfer points.
- Any anticipated backlog of semitrailers at these sites.

The area should be large enough and have an acceptable internal roadnet to allow space for parking and marshaling incoming and outgoing semitrailers and prime movers. The area should be level and well-drained. It should have a suitable hardstand that can withstand heavy vehicular traffic. The truck park should be located near supported activities and the MSR. Space requirements may make it infeasible to establish truck terminals and TTPs adjacent to the MSR. If this is the case and if good feeder routes are available, they may be established off the MSR. Truck parks may also be co-located with motor transport units in motor park areas. Security must be provided for both the operating area and the vehicles and cargo handled within the area. The motor transport unit at the location provides security for Level I threats. When the terminal is part of a base or base cluster, the base or base cluster commander coordinates added security based on the threat level.

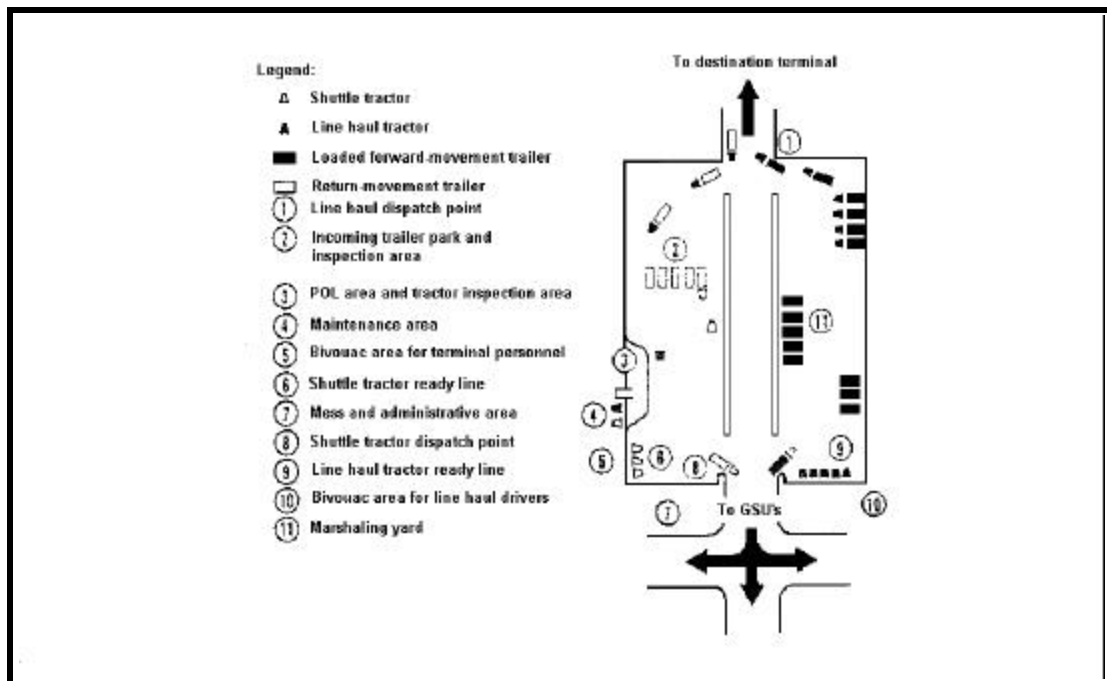


Figure 4-6. Typical truck terminal

One or more truck terminals may be established at intermediate points along the line haul route. The location(s) and number of these terminals depend upon the organization of the line haul operation and the location of supported units. The truck terminals deliver cargo to supply support activities near the line haul route. When this occurs, they function in a dual capacity:

- As a truck terminal that manages delivery of cargo to destination in the vicinity of the terminal.
- As a TTP that processes cargo loads moving through the facility to destinations further forward on the line haul route.

The truck terminal is usually commanded and operated by a motor transport battalion. The battalion either supports or coordinates support to the terminal. Terminals need facilities for dispatch, messing, maintenance, servicing, fueling, and sleeping. If refrigeration vans and/or containers are used in the system, electrical facilities and refrigerator unit maintenance services will be needed.

(2) **Trailer transfer points.** TTPs are established along the line haul system to divide the line haul into legs (segments). At TTPs, semitrailers are exchanged between line haul tractors operating over adjoining segments of a line haul route. TTP functions also include reporting, vehicle and cargo inspections, documentation, and dispatching. Based on the availability of local support, TTPs may provide mess, maintenance, and other support for TTP personnel and line haul drivers.

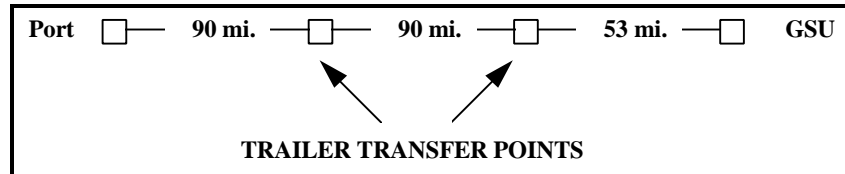
Line haul tractors arriving from rear areas deliver loaded semitrailers at a TTP and pick up empty or retrograde semitrailers for return movement. Line haul tractors coming in from forward areas drop their empty or return-loaded semitrailers and pick up the forward-moving loads for further movement toward ultimate destinations. Shuttle tractors may be used within the TTP to spot and prepare semitrailers for movement. This action reduces turnaround time of line haul tractors and makes the operation more efficient. TTPs are not used for pickup and delivery of cargo.

The distance of a line haul leg is based on a 10-hour shift per driver and 1 hour of delay. Therefore, the optimum one-way travel time between TTPs is 4.5 hours. Using this planning factor, each driver can complete one round trip per shift. This eliminates the need for billeting drivers away from their assigned unit, provides rested drivers for each trip, and allows for vehicle maintenance.

The distance between TTPs is calculated by using the 10-hour shift and 1-hour delay, factoring the march rate into the equation. In this example, the planners determine that 40 KMIH march rate can be sustained on the route:

$$\begin{aligned}
 \text{Distance} &= \frac{(10 \text{ hours per operating shift} - 1 \text{ hour delay}) \times 20 \text{ MPH}}{2 \text{ trips per day}} \\
 &= \frac{(10-1) \times 20}{2} \\
 &= 90 \text{ miles between the TTPs}
 \end{aligned}$$

The same formula is used to determine the distance between each successive TTP. The distance will change if the sustained march rate over the segment increases or decreases from the segment before it. If the march rate over the entire route is the same, then the distance between TTPs will be relatively equal. There will be variations because of finding suitable sites for the TTPs. When there is a leftover distance or short leg, the short leg should be placed forward. This is to allow for rapid expansion of the operation:



(3) **Assignment of semitrailer equipment.** Efficient use of motor transportation assets enables company-size units to perform a variety of tasks under different circumstances. Units are often separated geographically from their parent headquarters.

The medium truck company may be assigned flatbed, bulk petroleum, or other types of semitrailers to perform its assigned mission. This variety of semitrailers enables the company to move general cargo, bulk liquid petroleum, refrigerated cargo, and/or containerized cargo without a change in basic organization or operation procedures.

The ratio of semitrailers to truck tractors in a line haul relay operation depends on the ratio of travel time to loading and unloading time. The number of semitrailers assigned is based on the maximum operating time for the tractors used in the line haul.

(4) **Accounting procedures for semitrailers.** Accounting for semitrailers can be solved in one of several ways. If relay operations are of short duration, semitrailers can remain assigned to companies and accounting procedures established to retain control. Another method is to transfer accountability to a higher headquarters and to maintain property books and control records at that level.

AR 710-2 authorizes the transport group or battalion to assume informal accountability for the semitrailers of assigned companies when a relay operation is established. When the provisions of AR 710-2 are in effect, the truck company commander is relieved of accountability for semitrailers assigned to his unit. However, the truck company commander is charged with direct responsibility for the semitrailers with which he is operating. Adequate care must be given to all semitrailers in the custody of the truck company.

The motor transport headquarters in charge of relay operations must establish accountability for all semitrailers used. It maintains property records in its supply section. Through its operations section, this headquarters must also establish report and control procedures. To pinpoint the location of semitrailers within the system, the headquarters must be able to identify and establish the responsibilities of a unit or person having custody of the equipment at any time.

The headquarters unit in charge of the relay operation establishes a trailer accounting office within its supply section. Data is recorded in a consolidated trailer property book. Upon completion of the operation, return of a unit to routine operations, or transfer of a unit to another command, the

property book is adjusted to reflect the change in status. Hand receipts are also adjusted by reassigning on-hand semitrailer equipment to the companies.

(5) ***Control of semitrailer equipment.*** In the centralized relay operation, accountability and control of semitrailer equipment are vested in the commander of the headquarters unit operating the relay operation. The supply section of the headquarters unit assumes property responsibility for the equipment, and the operations section of the headquarters assumes responsibility for operational control. Control is maintained through reports from units and maintenance of those records. Maximum use of reliable communications is imperative to maintaining control.

At the operating level, the unit or convoy commander is directly responsible for the semitrailer equipment employed in the relay operation. Reports forwarded to the headquarters operations section from TTPs, truck terminals, airfields, and other customers provide a daily check on the location of all semitrailer equipment and on the status and condition of that equipment. See Appendix K for records and reports used in the control of trailers.

(6) ***Maintenance and repair services.*** Vehicles engaged in line haul/relay operations may operate up to 20 hours a day over extended periods. Such heavy usage increases maintenance requirements. To provide maintenance services at truck terminals, battalions (or appropriate motor transport headquarters) may detach the required maintenance personnel, tools, and equipment from assigned companies or request augmentation maintenance teams. Under certain circumstances, available nondriver personnel may be used as mechanics' helpers.

Battalions may establish consolidated maintenance facilities, which pool unit maintenance skills and resources, to either supplement or support unit-level maintenance operations. Depending on the situation, a consolidated maintenance facility may be established by--

- Consolidating all unit maintenance personnel into one centralized area or pool under battalion supervision.
- Tasking only the mechanics required to perform certain consolidated maintenance tasks under battalion supervision.
- Rotating company mechanics to the battalion maintenance service.

Semitrailers used in relay operations are away from the parent unit most of the time. Individual units cannot retain maintenance records and individual vehicle files for semitrailers used in the system. The central accounting office may maintain these files, and all other maintenance papers accompany the semitrailer. If no papers accompany the semitrailer, a maintenance schedule board may be stenciled on the tarp box for recording scheduled maintenance services.

d. **Area Support Operations.** In addition to clearance and line haul operations, motor transport supports local requirements that originate in and support the operations of bases and base clusters at each echelon. They may include ASGs and CSGs. These units provide DS/GS supply, maintenance, and services to units stationed in or passing through their respective areas. Requirements are passed through normal movement control channels.

These operations frequently involve the movement of small quantities of cargo and personnel to and from dispersed sites. As a result, light trucks up to 5 tons are probably most suitable for this

function. Engineer construction requirements may entail the movement of heavy, outsize materials. In these cases, provisions must be made for specialized hauling equipment such as 60-ton semitrailers, 25-ton low-bed trailers, and pole trailers, as well as medium and heavy semitrailers.

e. **Transfer Operations.** Transfer points are used when conditions require transfer of cargo from one transportation mode or conveyance to another. Transfer points may be established at rail facilities, pipeline takeoff points, air terminals, ports, beach sites, or inland waterway terminals. Transfer operations are conducted by cargo transfer companies. Operations and required facilities for motor transport service at a transfer point are similar to those of a truck terminal.

f. **Drive-away Operations.** Drive-away operations involve over-the-road movement of vehicles, other than assigned task vehicles of the motor transport unit. These operations include such over-the-road movements as--

- Driving pipeline and maintenance float stock vehicles coming into theater from points of entry to either general or direct support activities or directly to receiving units.
- Driving such vehicles to points of exit from theater for redeployment.

Drive-away operations vary in size. They may involve a one-time movement requiring driver support of truck company strength or less. They can also be extended operations requiring driver support by one or more motor transport battalions. The method of carrying out a drive-away movement depends on the distance involved and the duration and scope of the operation. This type of movement normally involves the standard convoy organization and operation.

Driver requirements in a drive-away operation can be reduced by double-stacking semitrailers and loading smaller vehicles onto larger vehicles. The use of tow bars or tandem semitrailers is prohibited unless authorized by the headquarters directing the move. For a discussion on methods of stacking semitrailers, see Chapter 10 of this manual.

Unit maintenance personnel must conduct a safety check on retrograde vehicles, particularly those showing heavy use, to ensure unit drivers are not operating unsafe vehicles. Unsafe vehicles must be convoyed to the destination using other means.

g. **Container Transport Operations.** Containers are specially designed cargo carriers that permit the packaging of small and/or loose cargo items into a single unit for security and ease of handling. Containers are a safe, secure means for loading (stuffing) cargo into a container at a supply source (such as a CONUS depot, COMMZ storage point, or corps supply point). The container is sealed at the source, and there is no need to open it or rehandle the cargo until it is delivered at destination. Cargo security is enhanced and cargo can be expected to be received intact and in serviceable condition.

Containers are hauled in any of the types of transport operations. Containers transported by trucks are handled as any other cargo. Pickup, movement, and delivery are made according to the type haul for which the motor transport is committed. However, the movement of containers requires consideration of CHE at the origin and destination.



The use and control of containers moving through the motor transport system is of prime importance. Personnel must adhere to all theater and local policies governing the handling and use of containers. This control and utilization policy also applies to the container chassis. Pickup, delivery, and return of containers must be accomplished by prescribed time standards. Movement control organizations ensure that using agencies rapidly load and unload container cargo. A reporting system must be in place to provide in-transit visibility. For commercial containers, contractual service agreements govern time limitations imposed on loading and unloading activities before demurrage costs start. The using agencies must make every effort to abide by these limits to control costs and return containers to the transportation system. Motor transport units must also note whether container cargo load and unload procedures are conducted according to established procedures. Violations are to be brought to the attention of the using agency and the proper motor transport command.

Containers may be off-loaded from chassis onto the ground to permit continuous use of container chassis. Some containers may be transported on conventional military cargo semitrailers as well as on a container chassis. In either case, the following policies apply:

- Containers designated for storage purposes or for other use by the consignee will, upon receipt at destination, be removed immediately from the transporting chassis/semitrailer. The chassis will then be returned to transportation use.
- In operations where containers will be lifted from or placed onto either chassis or other transporting vehicles, planners and operators should ensure that proper and sufficient handling equipment is available to accomplish these tasks.
- Each transfer point should establish an external container inspection program. External container inspections aid in determining liability for container damage and/or loss. Inspections should be made at the time of pickup and delivery to cover the time the containers are in the hands of the motor transport service. Inspection forms should be required and may be prepared and reproduced locally. See Appendix L for a container inspection checklist.

**h. Retrograde.** Retrograde is any movement of a command to the rear or away from the enemy. This includes movements within a theater of operations and between a theater of operations and CONUS. Its main purpose is to return containers, reparable, and other cargo back to the supply or transportation system for reuse, alternate use, or repair. It is also a means for carrying human remains, EPWs, and personnel.

Retrograde is not a type of motor transport operation. Rather, it is a means to increase the efficiency of the transportation system by taking advantage of vehicles that would otherwise be returned empty. Returning loaded equipment offers enhanced use of motor transport capabilities through the increase of tonnage hauled and ton-miles accomplished. It limits deadhead miles and may reduce the total number of vehicles required.

Retrograde movements must be coordinated through movement control channels. Requirements are identified, requested, or programmed like any other movement requirement. Synchronization is also required to ensure drivers receive accurate information. Communications forward is essential to reroute or divert vehicles in the forward area. Drivers may report to a different loading site some distance from their unloading point to pick up return loads. They may also pick up return loads anywhere along the return route. Vehicles can be used specifically to pick up retrograde loads if unacceptable delays are experienced due to either the requirement for vehicles to travel to a

different location or a long delay in reloading. Special consideration must be applied in the retrograde of cargo to CONUS or to another theater for the conduct of other force projection operations. Commanders must ensure that quarantine, agriculture, and customs inspections are completed and documented according to AR 40-350 and applicable TMs.

**4-8. SUPPORT TO COMBAT OPERATIONS.** Motor transport units may be used in direct support of tactical movement or other combat operations. Corps and divisions may use organic or attached motor transport as a pooled service where and when needed to displace heavy forces, move light forces, or provide mobility to headquarters and nonroadable equipment. Motor transport units are required to be as mobile as the supported unit at each echelon.

When supporting combat forces directly, both the movement control organization and motor transport commander should maintain a close liaison with the combat force to ensure effective support. Nonorganic motor transportation assets may be attached to combat forces for short periods. However, theater priorities usually dictate that trucks are provided on a mission basis and returned to control of the motor transport commander for common use.

**4-9. HEAVY EQUIPMENT TRANSPORTER.** The HET will be used primarily to displace heavy forces, either operationally or tactically. This supports versatility by increasing the maneuver commander's capability to quickly and efficiently shift forces on the battlefield and have forces available at destination in a high state of readiness.

In an operational mobility role, the HET will move the tracked vehicles of heavy forces from ports of debarkation to assembly areas in the corps area. In this role, HET companies will be under the command and control of a functional transportation battalion.

In a tactical mobility role, HETs will move heavy forces in the corps area as far forward as METT-T factors will permit. Once the HET has been committed to tactical mobility (normally four companies per corps), a functional TMT battalion headquarters will be used for command and control. This headquarters will be in addition to the TMT battalion normally aligned with a CSG (rear).

Use of HETs in either role will be by company or platoon. They will not normally be employed as individual vehicles. Most often, HETs will be used for a one-time lift (direct haul) to move up to a brigade-size force. In convoy operations, they may be integrated with roadable wheeled vehicles of the supported combat force or they may move independently. HETs can also be used to support evacuations. Because routes must be able to accommodate the weight and width of the HETs, movement control interface and planning is essential.